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Reserve

A Coordinated Program \_\_\_\_\_  
to Develop the Use of \_\_\_\_\_  
\_\_\_\_\_ ELECTRIC FEED GRINDERS  
\_\_\_\_\_ on ELECTRIFIED FARMS

PEA Cooperatives  
Agricultural Extension Service,  
Feed Grinder Manufacturers and  
Prepared for other organizations sponsoring  
better dairy, poultry and live-  
stock production

U.S. Rural Electrification Administration  
United States Department of Agriculture

## SECTION I

5875A



SECTION I

Educational Procedure

Section II of this portfolio, covering  
Purchasing Procedure, will follow.

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Educational Procedure

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## Foreword

The past five years have seen the extension of rural electric lines in all parts of our nation, more than doubling the number of farms served, and offering to hundreds of thousands of farmers new opportunities for better and more profitable farm management.

One of the widely useful and adaptable electrical devices is the small electric feed grinder, which will permit the average farmer to make important economies in feeding farm animals.

The program here presented is intended to assist the Extension Service, REA Cooperatives and other interested groups in their efforts to extend the usefulness of electricity by developing the use of electrically operated feed grinders.



PART ONE

The REA Program

The purpose of the Rural Electrification Act of 1936:

"To furnish electric energy to  
persons in rural areas who are  
not receiving central station  
service....."

PART ONE

The RMA Program

The purpose of the Rural Electrification Act of 1936:

"To furnish electric energy to  
persons in rural areas who are  
not receiving central station  
service....."

REA Power Service Development

PROGRESS SUMMARY

to December 15, 1939

<u>Year</u>	<u>REA Borrowers</u>	<u>Potential Members</u>
1936	15	47,769
1937	50	194,678
1938	371	278,930
1939 (Dec. 15)	688	815,559

# RIA Power Service Development

## THROUGHOUT COUNTRY

to December 31, 1955

Year	RIA Investment	Estimated Receipts
1955	15	67,000
1956	20	100,000
1957	31.5	210,000
1958 (Dec. 31)	60	317,000

SUMMARY BY STATES  
(December 15, 1939)

<u>State</u>	<u>REA Borrowers</u>	<u>Potential Members</u>
Alabama	15	17,676
Arizona	3	1,553
Arkansas	13	19,811
California	4	3,765
Colorado	11	9,252
Delaware	1	2,568
Florida	7	5,766
Georgia	36	59,164
Idaho	7	5,620
Illinois	27	41,523
Indiana	43	57,819
Iowa	50	41,180
Kansas	20	14,342
Kentucky	24	31,913
Louisiana	11	9,729
Maine	2	767
Maryland	2	1,414
Michigan	14	34,396
Minnesota	39	42,574
Mississippi	23	28,413
Missouri	30	33,793
Montana	11	6,447
Nebraska	28	22,774
Nevada	1	843
New Hampshire	1	1,095
New Jersey	2	1,337
New Mexico	3	1,545

ESTABLISHED  
1867

<u>State</u>	<u>REA Borrowers</u>	<u>Potential Members</u>
New York	1	4,901
North Carolina	22	24,185
North Dakota	7	4,845
Ohio	26	46,600
Oklahoma	18	18,861
Oregon	6	2,519
Pennsylvania	13	22,573
South Carolina	12	15,233
South Dakota	7	4,350
Tennessee	17	40,329
Texas	59	64,096
Utah	3	1,529
Vermont	2	626
Virginia	14	21,521
Washington	13	7,742
West Virginia	2	1,538
Wisconsin	28	32,892
Wyoming	10	4,140
TOTAL	<u>688</u>	<u>815,559</u>

NOTE: Detailed lists and maps of cooperatives by states will be supplied by REA on request.



## THE REA UTILIZATION JOB

Utilization activities of the REA are designed to develop the effective and abundant use of electricity on the electrified farm. These activities involve a double responsibility.

First: To assist farm families on REA-financed electric lines in the realization of maximum convenience and economic benefits from electric service.

Second: To so plan the program of farm and farm home utilization with the projects that consumption load will insure maximum benefits to the members and the financial success of the electric service system.

These responsibilities demand two related types of activity:

Educational - Appliance method and result demonstrations with related subject matter presentation.

Promotional - Stimulation to encourage prompt installation of appliances that give maximum benefits from electric service.



## PART TWO

### Procedure for Utilization Program

A method for extending the profitable use of one farm appliance:  
the electric feed grinder.



## FEED GRINDER ADAPTABILITY

### A. To the needs of the individual farmer:

The small size, low cost electric grinder provides a feasible investment for nearly every farm producing feed grains for dairy cattle, poultry, and other farm animals. The power cost is usually lower with electricity. Electricity also provides more convenient service. A feed grinder on the farm encourages continuous preparation and balancing of feeds which insures the greatest possible returns from both the feed and the livestock.

These small feed grinders are especially suitable for the preparation of grains for human consumption, thus facilitating "live at home" programs.

### B. To the best interests of an educational utilization program:

The electric feed grinder is an income producing farm appliance. Its proper adaptation and use will encourage the use of other advantageous electrical appliances on the farm and in the farm home.

### C. To the electric service system:

The single-phase line generally used in rural electric distribution is adequate for the low-power feed grinder and its use will generally not coincide with any peak load period.



## THE COORDINATED FEED GRINDER PROGRAM

TWO STEPS will insure SUCCESS:

### STEP ONE: EDUCATION

The primary responsibility for this phase of the program rests on the EXTENSION SERVICE.

It consists of demonstrating suitable types of feed grinders in connection with the various livestock enterprise feeding meetings and schools, or special feed grinder meetings which will include feed preparation and feeding subject matter. Regular supporting helps such as news stories, circular letters, charts and pictures should supplement these educational activities.

Demonstration units will be furnished by the REA-financed systems in the areas which they serve.

### STEP TWO: UTILIZATION

The REA-financed systems will assume responsibility for developing plans and procedures to assist their members in acquiring feed grinders that are best suited to the most economical production in the various livestock enterprises.

Detailed procedures for effecting this purchase and installation program are outlined in Section II. These procedures make it possible for farmers to select grinders for highest efficiency and durability and through group purchasing and bargaining to secure them at lower cost.



PART THREE  
Coordinated Educational Procedure

U.S.D.A. Extension Service  
State Extension Services  
REA Cooperatives.



This coordinated program to develop the use of electric feed grinders on electrified farms has been -

APPROVED BY THE REA AND THE EXTENSION SERVICE, USDA.

**BACKGROUND** Rural Electrification, with its many uses for convenience and increased income coupled with improved "land use" practices, demands the fullest consideration of every agricultural extension service worker as a tool in teaching better farm and home practices.

The newly-developed small feed grinder is an example of an income-producing appliance that fits into the existing nutrition programs on electrified farms in every state. New appliances, like new crops, must be thoroughly demonstrated to prove their adaptations to each farm enterprise and each individual farm unit. From the results of such demonstrations more specific recommendations can be made.

**PROCEDURE** Detailed plans for coordinating the activities of the REA and of the individual state agricultural extension services on a program to develop the use of small electric feed grinders will be prepared in conference with both organizations represented.

REA-financed electric systems will cooperate with each coordinated state program by providing demonstration equipment and other facilities. The educational program designed to aid the farmer in adapting electric energy to his needs will be most effective if built upon close cooperation between each REA-financed system and the extension agents in the area which it serves.

It is expected that the State Agricultural Extension Service will provide subject matter material and other regular aids for the educational program in the same manner and for any extension program.



## EDUCATIONAL PROCEDURE

(For Agricultural Extension Service)

The preceding section presents briefly the challenge to State Agricultural Extension Services.

The suggested conference of subject matter specialists, administrative staff members and others representing the State College of Agriculture with REA representatives which has been or will be held places the situation squarely before the entire group for their recognition and consideration.

An outline of procedure such as the following can be developed by the State Extension Service in line with existing policies and procedures for participation in the program. Such procedures will facilitate coordination between REA, the Extension Service and REA-financed Systems.

1. The Agricultural Engineering staff ...
  - a. Provides data on first cost and operating costs of various sizes of electrically operated feed grinders for the use of all subject matter specialists and extension agents. Comparisons of the electric units with other available sources of power and grinding facilities should be included.
  - b. Cooperates with other specialists, extension agents and REA system managers in setting up and collecting data on method and result demonstrations.
  - c. Informs other specialists of areas where rural electrification is developing and where demonstrational activity should be undertaken.
  - d. Prepares subject matter material in chart form for use in educational meetings.
  - e. Prepares subject matter and result demonstration material for news articles.



2. Poultry, Dairy, Livestock and other staffs ...
  - a. Prepare subject matter material on the value of grinding feeds, proper fineness for different ages and kinds of livestock, kinds of feeds that should be ground, and value of freshly ground feed.
  - b. Establish "Animal Unit" or other basis for guiding the farmer in his selection of the most suitable feed grinder for his needs.
  - c. Include feed preparation and feed grinders in their regular feeding meetings and demonstrations.
  - d. Cooperate with the engineering staff and extension agents in securing and analyzing demonstration data.
  - e. Cooperate with engineering staff in the preparation of subject matter charts and news articles.
3. County and Home Agents ...
  - a. Become familiar with the coordinated program and the subject matter provided by the State Extension Service.
  - b. Cooperate with the educational program by providing leadership and consultation in setting up the feed grinder educational program with the rural electric cooperatives.
  - c. Initiate method and result demonstrations and educational meetings.
  - d. Prepare news stories on subject matter and demonstration results.
  - e. Use other extension methods to project the educational program.

NOTE: Detailed recommendations for participation by the Agricultural Extension Service, will be prepared by the respective state committees. Copies will be sent from the State Extension office to County Agents and REA Superintendents or Managers.



## EDUCATIONAL PROCEDURE

(For the REA Electric Cooperative)

### Section I. Educational Program Procedure

Proceed with the educational program in close cooperation with the Agricultural Extension Service. Follow the suggested plan.

Here's How! ...

Step I. Cooperative Manager must become familiar with the entire program.

#### Step II. PRESENTS THE PROGRAM TO THE TRUSTEES

- a. Invite your County Agent to attend this meeting and participate in the discussion of local adaptations and uses of the small grinder.
- b. Prepare and present general information about the program as contained in this portfolio and other information received from REA relative to the program.
- c. Get trustees' approval to proceed with the program as outlined.
- d. Appoint a "Feed Grinder" Committee. Keep the Committee small, preferably not more than five members, strategically located, who are interested in good livestock feeding practices and who are recognized community leaders.

The County Agent or Agents should be made consulting members of the Committee for the duration of the educational program.

One of the regular members should be designated as Chairman of the Committee. The Cooperative Manager or Utilization Specialist may serve as secretary to the Committee.

- e. EXECUTE a RESOLUTION covering action taken by the trustees and MAIL to Utilization Division, REA, Washington. Keep a copy of the Resolution in the regular minutes of this meeting.

MINUTES OF THE MEETING

of the Board of Directors

held on the 10th day of January, 1901

The meeting was called to order at 10:00 A.M. by the President, Mr. J. H. Smith.

Present:

Mr. J. H. Smith, President; Mr. W. H. Jones, Vice-President; Mr. R. L. Brown, Secretary.

Also present: Mr. A. B. White, Mr. C. D. Green, Mr. E. F. Black.

The minutes of the last meeting were read and approved by the Board.

Resolved, That the sum of \$100.00 be paid to the Treasurer for the purchase of new office furniture.

Resolved, That the sum of \$50.00 be paid to the Treasurer for the purchase of new office supplies.

Resolved, That the sum of \$25.00 be paid to the Treasurer for the purchase of new office equipment.

Resolved, That the sum of \$10.00 be paid to the Treasurer for the purchase of new office materials.

Resolved, That the sum of \$5.00 be paid to the Treasurer for the purchase of new office tools.

Resolved, That the sum of \$2.50 be paid to the Treasurer for the purchase of new office accessories.

Step III. CALL A MEETING OF THE FEED GRINDER COMMITTEE ...

- a. Review the entire program and facilities or situations bearing upon the success of the program.
- b. Draft a plan for the use of demonstration equipment, list the communities the program should reach and kinds of demonstrations that will be most effective.
- c. Arrange to enlist the cooperation of farm organizations and others that can aid the program.
- d. Examine the "Offer to Sell Electrically-Operated Feed Grinder Demonstration Units" which REA has secured from manufacturers.

Select for purchase such Demonstration Units as the Committee decides will be most suitable for demonstration in the Cooperative's service area.

It is more important to select various unit sizes that meet local needs than to select different "makes" of the same size.

- e. Mail Purchase Order to Utilization Division, REA, Washington.

Step IV. After Demonstration Units are received ...  
COMMITTEE CHAIRMAN CALLS SECOND MEETING

- a. Review progress and developments of the educational program.
- b. Revise previous plans as necessary.
- c. Prepare detailed Schedule of Meetings and other activities. Send this Schedule to local newspapers and radio stations, and circularize all members.



SPECIAL RESPONSIBILITIES

OF

COOPERATIVE MANAGER

AND

UTILIZATION SPECIALIST

- a. Sub-meter each Demonstration Unit.
- b. Transport and install Units where requested or approved by the County Agent for demonstration purposes.
- c. Be sure that wiring is adequate for proper demonstration of the feed grinder.
- d. Operate units during method demonstration meetings.



APPENDIX "A"

Electric Feed Grinders



SPECIFICATIONS ADOPTED BY THE RURAL ELECTRIFICATION  
ADMINISTRATION OF UNITED STATES OF AMERICA  
FOR FEED GRINDER EQUIPMENT AND INSTALLATION  
PREREQUISITE TO REA FINANCING  
Dated December 15, 1939

GENERAL:

These specifications pertain to the supplying to persons (hereinafter called "Consumers") receiving or proposing to receive electric service from a Rural Electrification Administration Project (hereinafter called the "Project"), with electrically operated grinding machines and the installation thereof. All such machines and installations must conform to these specifications to be eligible for REA financing. The supplier is herein called the "Contractor."

These specifications are divided into two sections: Section A, Hammer Mill Structural Specifications; and Section B, Grinding Machine Performance Specifications.

SECTION A. Hammer Mill Structural Specifications:

The hammer mill herein specified and to be included in each such installation is of the type commonly designated as hammer mills for agricultural use. Each hammer mill shall be supplied with, and driven by a new electric motor of the most recent improved design and manufacture, and specifically adapted to the hammer mill with which it is furnished. The Contractor will furnish and install all electrical equipment from the service outlet in accordance with specifications contained herein. All expense incident to the manufacture, transportation and installation of each hammer mill, motor, and wiring in accordance with these specifications shall be borne by the Contractor, except as herein otherwise specified.

It is the intention of these specifications in all points, whether or not specifically covered herein, to obtain equipment of first class, modern engineering design, construction and workmanship, and which has proved best suited for the purpose for which it is to be used. Minor variations in the details of these specifications may be made where they are necessary to permit the Contractor to furnish standard equipment, provided the Contractor calls attention to the variation and, provided, also, that the Utilization Division, REA, acting for the Consumer, approves the equipment offered as being at least equally suited to the intended use. All work must be done in a thoroughly workmanlike manner by mechanics skilled in their various trades. All parts shall be made to standard gauge where possible and like parts shall be interchangeable. The Contractor shall be prepared to show that all parts are properly proportioned to withstand the stresses to which they will be subjected and that the construction is in accordance with the best American practice. Specifications on metals, gray iron castings, high test gray iron castings, malleable



iron castings, black and zinc-coated sheet iron and steel, cable and conduit fittings shall conform to the United States Government Federal Specifications Numbers - QQ-M-151a, QQ-I-651, QQ-I-656, QQ-I-666, QQ-I-696, W-F-406, in so far as these are applicable, and where these are not applicable, the characteristics, unless otherwise particularly specified, shall conform to the latest standards published by the American Society for Testing Materials. Electrical apparatus shall conform to the latest Standardization Rules of the American Institute of Electrical Engineers and of the National Electrical Manufacturers' Association, unless definitely specified otherwise.

#### Hammers:

Either swinging or fixed hammers may be used. There shall be at least 2 1/2 hammer tips per inch effective width of cylinder. These hammers or hammer tips shall be of at least 450 Brinnell hardness, or the equivalent. Hammer tips or hammers either swinging or fixed shall be reversible. Hammer pins for swinging hammer machines shall be steel at least the equivalent in analysis of SAE-#1095.

#### Cylinder Shaft:

Except where hammer head is mounted directly on the motor shaft, the cylinder shaft shall be of at least SAE-#1020 analysis and mounted on two suitable ball bearings including dust seals with adequate method of lubrication.

#### Vibration:

When the mill is assembled and operating at normal speed, there shall be no undue or excessive vibration.

#### Cylinder Housing and Base:

The cylinder housing and base shall be made of close grained cast iron, cast steel, or rolled steel of the proper thickness to withstand all strains incidental to service of the hammer mill. Electric welding may be used in the fabrication, provided that the American Welding Society Code for Fusion Welding and Flame Cutting in Machinery Construction is met.

#### Elevating Blower:

On mills equipped with elevating blower and sacker, the elevating blower shall be mounted on the end of the cylinder shaft or shall be mounted independently and driven by suitable V-belt and pulleys. Independently mounted blowers shall have the same specifications for blower shaft, and blower casing as cylinder shaft and cylinder housing and base. The blower shall have sufficient capacity to elevate ground



material without clogging to dust collector and sacker to a maximum height of twenty-five feet above the hammer mill base.

Elevating Pipe:

Elevating pipe shall be of sufficient diameter to elevate the ground material at maximum capacity of the mill without clogging. Elbows shall have sufficient radius of curvature to prevent clogging at maximum capacity of the mill. There shall be supplied adequate fasteners for fastening the joints of elevating pipe while in use.

Dust Collector and Sacker:

The dust collector and sacker shall be made of at least 26 gauge galvanized iron or steel and shall have sufficient capacity to handle the maximum capacity of the mill without clogging. Dust collector and sacker shall be sturdily mounted.

Motor Drive:

The electric motor shall drive the hammer mill by having the hammer assembly mounted directly on the shaft, by one or more V-belts, or by directly connecting to the cylinder shaft. The one or more V-belts shall have an overload factor of 40% above the rated horsepower of the motor and the belt speeds shall not exceed 5,000 feet per minute. Direct connections shall have an overload factor of 50% above rated motor horsepower. The V-belts and sheaves shall be Allis-Chalmers Texrope standard stock belts and sheaves or equal and approved equipment.

Screens:

Three screens for grinding to coarse, medium and fine fineness shall be furnished with each hammer mill. The medium fineness results shall meet the moduli numbers given in Section B of these specifications.

Repair Parts:

The manufacturer of hammer mills shall guarantee to maintain, for a period of ten years, a suitable supply of repair parts or a suitable supply of usable replacements parts. Also a parts catalogue shall accompany each grinder.

Electric Motors:

All motors installed with hammer mills purchased herewith shall be of the repulsion-start induction or capacitor type. They shall be of Westinghouse Type FR, CR, or CU type repulsion-start induction, General Electric Type SCR repulsion induction, Westinghouse Type FS.

# THE HISTORY OF THE UNITED STATES

1776

The first of July 1776, the Continental Congress declared the United States to be a free and independent nation, no longer bound to the British Empire. This declaration was a bold step, as it meant that the colonies were now responsible for their own actions and fate.

## DECLARATION OF INDEPENDENCE

The Declaration of Independence was a document that set out the reasons for the colonies' decision to break away from Britain. It was signed by the members of the Continental Congress, and it was a statement of the colonies' rights and freedoms.

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capacitor, General Electric Type KC Capacitor, or equal and approved equipment. Motors shall be wound for single-phase (unless otherwise specified) 60-cycle, 110-220 volt service, continuous duty, and a synchronous speed of 3600 rpm. or less. All motors shall be equipped with cast phosphor bronze sleeve bearings for oil lubrication, or precision ball bearings with housings sealed to prevent the entrance of dust. All motors shall have a service factor of fifteen percent in accordance with the rules of the National Electrical Manufacturers' Association. Each motor must be capable of starting and quickly bringing its hammer mill to full speed when the mill is empty.

Rating, Torque, Starting Current:

The motor to be furnished with any hammer mill shall have such rated capacity that the average power required to drive the hammer mill for the guaranteed capacity given by the manufacturer will not exceed the rated horsepower of the motor for the period of the test.

Temperature:

Each motor shall be capable of carrying its rated load continuously without a temperature rise exceeding 40° centigrade for semi-enclosed motors or 55° centigrade for totally enclosed motors, in any part of the rotor or stator. The temperature rise is to be based upon an ambient temperature of 40° centigrade.

Motor Construction:

The motor and controls to be furnished by the hammer mill manufacturer or contractor shall be of standard rated capacity and shall be guaranteed by the hammer mill manufacturer or Contractor to comply with the requirements and recommendations of the latest standards of the American Institute of Electrical Engineers, the National Electrical Manufacturers Association, the Underwriter's Laboratories, Inc., and the National Electrical Code, pertaining to ratings, operation, torques, power factor, rotor and stator construction, ventilation, insulating and protection of terminals, automatic and self-contained lubrication, steady bearings and supports with uniform air gaps, etc., for this type of motor and for the service to which these motors shall be used. Motors one horsepower and larger shall be furnished in frames having standardized mounting and heights of shaft dimensions.

The motors and controls may be of any manufacture as required by the hammer mill manufacturer and shall be guaranteed by the hammer mill manufacturer, when connected to the hammer mill in service, to fulfill all requirements hereinbefore specified under "Hammer Mills."



## Motor Controls (Revised)

Any motor control listed with Underwriter Laboratories as approved for the purpose is acceptable providing such control is equipped with overload protection, meets with the National Electric Code for motor disconnecting means, and complies with our special requirements listed below.

The push button, trip, or handle for engaging or disengaging starters shall be of recessed type, or this equipment shall have adequate protection to prevent accidental operation.

All starters shall be two pole, (considering 2-pole magnetic starter with interlock, as two-pole) except that for motors of less than one horsepower and for 220 volt 1 H.P. motors, a single pole starter may be used provided a polarized attachment plug and outlet receptacle is furnished as standard equipment.

The overload heaters and linestarters shall be furnished in accordance with current horsepower rating of each size of motor. Upon tripping of either thermal relay, the device shall be capable of being reset without the replacement or renewal of any parts after a delay of one minute from the tripping time.

All motor controls must be equipped with a means of an absolute line disconnection of power. On motors of  $1\frac{1}{2}$  H.P. and up to 5 H.P. inclusive, the motor must be provided with a safety switch equal in quality to the Westinghouse Type D switch unless an absolute disconnecting means to meet requirements of the National Electric Code is provided in the motor control furnished.

Each bidder shall submit details of control equipment included in bid.

Motors of  $1/2$ ,  $3/4$  and 1 H.P. may operate on either 110 or 220 volt, 60 cycle, single phase service. Motors of  $1\frac{1}{2}$  H.P. and over, must operate on 220 volt, 60 cycle, single phase service.

Motor controls must be mounted on and wired directly to the motor and as such the motor and control unit will be considered portable. Fifteen (15) feet of type S cord, suitable polarized plug and receptacle, shall be furnished as a service cord from the linestarter or motor to a suitable outlet box furnished by the Consumer. This cord shall be equipped with green grounding conductors for grounding motor frame. The Contractor shall show in "Schedule of Prices on Additional Hammer Mill Equipment" the cost per foot of additional type S cord for further extension of service cord.



Type S cord shall be three conductor and be used in accordance with the following table:

No. 14 wire	for 1/2, 3/4 and 1 H.P.	110 and 220 volt service
No. 12 wire	for 1 1/2, 2 and 3 H.P.	220 volt service
No. 10 wire	for 5 H.P.	220 volt service

The attachment plug and receptacles shall be three wire and have at least the following current capacities:

10 amperes	for 1/2, 3/4 and 1 H.P.	220 volt service
10 amperes	for 1/2 H.P.	110 volt service
20 amperes	for 3/4 and 1 H.P.	110 volt service
20 amperes	for 1 1/2 and 2 H.P.	220 volt service
30 amperes	for 3 and 5 H.P.	220 volt service

#### SECTION B. Grinding Machine Performance Specifications:

The Contractor shall submit such prints, descriptive and technical matter as is necessary to show the performance and construction of the equipment proposed to be furnished. All efficiencies stated herein are true overall input-output efficiencies.

#### Guarantee of Performance:

The Contractor must give a guarantee of the performance of the hammer mill by data giving the number of K.W.H. per ton of feed ground. The feeds ground shall comply with the following United States Official Grain and Hay Standards:

<u>Official Grade</u>	<u>Weight per Bushel</u>	<u>Moisture Content</u>	<u>Cracked or Damaged Grains</u>
		Wheat (Soft Red Winter)	
2	58#	15.5%	4%
		Corn (Yellow, white or mixed)	
2	53#	15.5%	3%
		Barley (Class I)	
2	46#	14.5%	8%
		Oats (white, red, gray, black or mixed)	
2	30#	16%	0.3%

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Alfalfa

Alfalfa with not over 5 percent grasses.

<u>Official Grade</u>	<u>Percent Leaves</u>	<u>Percent Green Color</u>	<u>Maximum percent Foreign Material</u>
2	25 or more	35 or more	10

Soybean Hay

Soybean Hay with not over 10 percent Johnson grass or 15 percent other grasses.

2	25 or more	25 or more	15
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Clover Hay

Clover with not over 20 percent timothy, other grasses, and - or grain hay.

2		30 or more	15
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The feeds shall be ground to medium fineness and fineness moduli (determined in accordance with the recommendations of American Society of Agricultural Engineers)\* given in the following table:

Ear Corn	3.60 or lower
Shelled Corn	3.60 or lower
Barley	3.20 or lower
Oats	2.90 or lower
Soy Beans	3.60 or lower
Wheat	3.20 or lower
Rye	2.90 or lower
Corn Stover	3.50 or lower
Corn Fodder	3.50 or lower
Soybean Hay	3.50 or lower
Alfalfa	3.50 or lower
Clover Hay	3.50 or lower

Note: Corn stover does not include ears. Corn fodder includes ears. For determining the input in K.W.H., if tests of 5 minutes or less, the K.W.H. shall be read to .001 on a kilowatt hour meter having a multiplication factor of .01. The motor used shall not be overloaded in accordance with the latest National Electrical Manufacturers' Association.

\* In making a fineness modulus determination a 250 gram sample of ground feed is oven dried at 100° to a constant weight. The sample is then poured into the top one of a set of standard Tyler 8 inch screens (size 3/8 inch and numbers 4, 8, 14, 48, 100) having varying sizes of openings with the coarsest screen at the top and the finest at the bottom. The set is then shaken on a Ro-Tap shaker for five minutes. The amount of material retained upon each screen is then weighed. The fineness modulus or index is the sum of the percentages of feed coarser than each of the screens divided by 100.

THE HISTORY OF THE  
CITY OF BOSTON

FROM THE FIRST SETTLEMENT IN 1630  
TO THE PRESENT TIME

BY  
JOHN H. COLEMAN

VOLUME I  
FROM 1630 TO 1700

THE HISTORY OF THE CITY OF BOSTON  
FROM THE FIRST SETTLEMENT IN 1630  
TO THE PRESENT TIME

1630	1631	1632	1633	1634	1635	1636	1637	1638	1639	1640	1641	1642	1643	1644	1645	1646	1647	1648	1649	1650	1651	1652	1653	1654	1655	1656	1657	1658	1659	1660	1661	1662	1663	1664	1665	1666	1667	1668	1669	1670	1671	1672	1673	1674	1675	1676	1677	1678	1679	1680	1681	1682	1683	1684	1685	1686	1687	1688	1689	1690	1691	1692	1693	1694	1695	1696	1697	1698	1699	1700
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THE HISTORY OF THE CITY OF BOSTON  
FROM THE FIRST SETTLEMENT IN 1630  
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standards. The type, manufacture, size and model number of the electric motor used in these tests shall be given.

Performance guaranteed must be consistent with the performance under operating conditions and with good manufacturing practice. In case of any reasonable doubt as to the ability of any Contractor to meet the guaranties which he makes, the Consumer reserves the right to require further proof. This further proof may be either certified test data or a witness test of a grinding machine of similar design and capacity, constructed at the Contractor's expense for such test.

#### Performance Tests:

Performance tests when required shall be designed to determine K.W.H. input per ton of ground feed. They shall be determined by capacity measurement, kilowatt hour meter input measurement, and fineness moduli of ground material including all losses. The input to the motor will be measured by calibrated kilowatt hour meter having a 0.01 multiplication factor. In case of dispute between the Contractor and the Consumer, the decision of an Agricultural Engineer approved by the Rural Electrification Administration and the manufacturer shall be final. If desired, the performance tests outlined below may be made on any or all grinding machines within a reasonable time after it has been installed and operated. In no event shall the test be delayed more than thirty days after the Contractor notifies the Consumer of the completion of the installation. Either the Consumer or manufacturer has the right to call for a performance test. If test fails to meet the Contractor's guarantee, the Contractor must pay for the test as well as make the machine comply with his guarantee or make satisfactory adjustments with the Consumer.

The Consumer and the Rural Electrification Administration reserve the right to test any machine installed and to select stock units at random for test purposes.

#### Hammer Mill Cylinder Speed:

The manufacturer is required to furnish, filled out, the chart, attached hereto, titled "Relation of Speed to No Load Power Demand." This chart is to show the demand of the mill operated at different speeds with and without the blower and sacker. The curves on the chart shall be plotted with at least one point for each 500 rpm. and the mill may be operated with an electric motor. Horsepower may be calculated from the energy input and a motor efficiency at part load. This chart shall be used to determine the most efficient rated speed of the hammer mill for use with electric motors. The provisions of this paragraph need not apply in those cases in which the hammer head is mounted directly on the electric motor shaft. In such cases, a written statement of the speed of cylinder and horsepower required for operation of the mill empty will be accepted.



Installation:

The Contractor shall set up on the Consumer's premises and operate the complete grinding machine as called for in these specifications unless the Contractor can make other satisfactory arrangements with the Consumer for installation on receipt of shipment of grinding machines.



# GUARANTEED OPERATING CHARACTERISTICS AND OTHER INFORMATION

Manufacturer \_\_\_\_\_ Grinder Model \_\_\_\_\_

Sacker and Dust Collector included (yes-no) \_\_\_\_\_

Grain	Motor Sizes	Screen Size	Mill Speed R.P.M.	Fine- ness Mod- ulus	Pounds Per Hour	Average Motor Demand (K.W.)	Motor Effi- ciency	H. P. to Belt	K.W.H. per Ton
Wheat									
Barley									
Oats									
Shelled Corn									
Shucked Ear Corn									
Snapped Ear Corn									

Note: Report only one grinder model. If motor size may be variable, report at least two selected sizes for all grains listed.



Relation of Speed to No Load Power Demand

Name of Manufacturer \_\_\_\_\_

Model No. \_\_\_\_\_

Motor Used (Size and make) \_\_\_\_\_

Tests are to be run with and without Blower & Sacker.







